

We Claim:

1                   1.     A method of quantizing digital video information, said method  
2 comprising:  
3             determining a buffer occupancy accumulator as a difference between an actual  
4             amount of bits used and a requested amount of bits; and  
5             limiting an amount of change in said buffer occupancy accumulator based upon  
6             frame properties.

1                   2.     The method of scaling digital video information as claimed in  
2 claim 1 wherein said frame properties comprise a frame type.

1                   3.     The method of scaling digital video information as claimed in  
2 claim 1 wherein said limiting an amount of change in said buffer occupancy accumulator  
3 is performed by clipping said buffer occupancy accumulator.

1                   4.     The method of scaling digital video information as claimed in  
2 claim 1 wherein said limiting an amount of change in said buffer occupancy accumulator  
3 is performed by scaling said buffer occupancy accumulator.

1                    5.        A method of quantizing digital video information, said method  
2 comprising:  
3                    determining a base quantizer value; and  
4                    determining a quantizer adjustment based upon frame properties.

1                    6.        The method of scaling digital video information as claimed in  
2 claim 5 wherein said frame properties comprise a frame type.

1                    7.        The method of scaling digital video information as claimed in  
2 claim 5 wherein said quantizer adjustment is further based upon a macroblock position.

1                    8.        The method of scaling digital video information as claimed in  
2 claim 5 wherein said quantizer adjustment is further based bits per pixel of a current  
3 frame.

1                    9.        The method of scaling digital video information as claimed in  
2 claim 5 wherein said quantizer adjustment is further based on a difference between a  
3 number of bits actually used and a number of bits that should have been used.

1                    10.    The method of scaling digital video information as claimed in  
2   claim 9 wherein said number of bits that should have been used is calculated in a manner  
3   that takes into account macroblock types.

1                    11.    The method of scaling digital video information as claimed in  
2   claim 5 wherein said quantizer adjustment is further based on a Normalized Sum of  
3   Absolute Differences (NSAD).

1                    12.    The method of scaling digital video information as claimed in  
2   claim 5 wherein said quantizer adjustment is further based on a macroblock activity  
3   measure normalization (mbactN).

1                    13.    The method of scaling digital video information as claimed in  
2   claim 5 wherein determining a base quantizer value comprises clipping said base  
3   quantizer value to produce an adaptively determined finite range.

1                    14.    A method of determining a quantizer for quantizing digital video  
2   information, said method comprising:  
3                      a delta value, said delta value comprising a difference between a number of bits  
4                      actually used and a number of bits that should have been used.  
5   wherein said number of bits that should have been used is dependent upon a frame type.

1                    15.     The method of determining a quantizer as claimed in claim 14  
2   wherein said number of bits that should have been used comprises using different  
3   calculations for Intra-macroblocks and Inter-macroblocks.

1                    16.     A computer readable medium, said computer readable medium  
2   comprising a set of computer instructions for performing the steps of:  
3           determining a buffer occupancy accumulator as a difference between an actual  
4           amount of bits used and a requested amount of bits; and  
5           limiting an amount of change in said buffer occupancy accumulator based upon  
6           frame properties.

1                    17.     The computer readable medium as claimed in claim 16 said frame  
2   properties comprise a frame type.

1                    18.     The computer readable medium as claimed in claim 16 wherein  
2   said limiting an amount of change in said buffer occupancy accumulator is performed by  
3   clipping said buffer occupancy accumulator.

1                    19.     The computer readable medium as claimed in claim 16 wherein  
2     said limiting an amount of change in said buffer occupancy accumulator is performed by  
3     scaling said buffer occupancy accumulator.

1                    20.     A computer readable medium, said computer readable medium  
2     comprising a set of computer instructions for implementing a video encoder by  
3     performing the steps of:  
4                    determining a base quantizer value; and  
5                    determining a quantizer adjustment based upon frame properties.

1                    21.     The computer readable medium as claimed in claim 20 wherein  
2     said frame properties comprise a frame type.

1                    22.     The computer readable medium as claimed in claim 20 wherein  
2     said quantizer adjustment is further based upon a macroblock position.

1                    23.     The computer readable medium as claimed in claim 20 wherein  
2     said quantizer adjustment is further based bits per pixel of a current frame.

1                   24.     The computer readable medium as claimed in claim 20 wherein  
2     said quantizer adjustment is further based on scaling factor multiplied by a difference  
3     between a number of bits actually used and a number of bits that should have been used.

1                   25.     The computer readable medium as claimed in claim 24 wherein  
2     said number of bits that should have been used is calculated in a manner that takes into  
3     account macroblock types.

1                   26.     The computer readable medium as claimed in claim 20 wherein  
2     said quantizer adjustment is further based on a Normalized Sum of Absolute Differences  
3     (NSAD).

1                   27.     The computer readable medium as claimed in claim 20 wherein  
2     said quantizer adjustment is further based on a macroblock activity measure  
3     normalization (mbactN).

1                   28.     The computer readable medium as claimed in claim 20 wherein  
2     determining a base quantizer value comprises clipping said base quantizer value to  
3     produce an adaptively determined finite range.